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CS 385: Applied Database Management Systems
29-3-16

1. Find the names of students who have taken Biology classes in both 2009 and 2010.

$\{t \mid \exists s \in student\ (t[name] = s[name] \wedge \exists u \in takes(u[ID] = s[ID] \wedge \exists u \in takes(u[ID] = s[ID] \wedge u[year] = 2009 \wedge \exists v \in course(v[course\_ID] = u[course\_ID] \wedge v[dept\_name] = \text{“}Biology\text{”}))) \wedge \exists w \in takes(w[ID] = s[ID] \wedge w[year] = 2010 \wedge \exists x \in course(w[course\_ID] = x[course\_ID] \wedge x[dept\_name] = \text{“}Biology\text{”}))) \}$

2. Find ID's of instructors whose salaries are less than some other instructors.

$\{t \mid \exists s \in instructor(s[ID] = t[ID] \wedge$
$\exists u \in instructor(s[salary] < u[salary])) \}$

3. Find all departments with the maximum budget.

$\{t \mid \forall s \in department(t[salary] \geq s[salary])\}$